Method and system providing unified DPSK-PSK signalling for cdma-based satellite communications

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Inventor(s): HO JIN-MENG (US); SHARMA RAMAUTAR (US)

Applicant(s):: AT & T CORP (US)

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Abstract

A method and a system for multi-user communications in a CDMA-based satellite network. An uplink RF signal containing a coded user message that has been differentially phase encoded and spread using a Walsh function and a pseudo-random number (PN) sequence for the uplink, is received by a satellite receiver. The received uplink RF signal is non-coherently quadrature demodulated and then despread using the uplink PN sequence and Walsh function. The differential phase signal carrying the coded user message is regenerated onboard the satellite by phase comparison and switched to a selected downlink transmitter. The quadrature components of the differential phase signal are then respread using a Walsh function and a PN sequence for the downlink, followed by quadrature modulation for transmission to a terrestrial receiver. The received downlink RF signal is coherently quadrature demodulated and despread using the PN sequence and Walsh function for the downlink. The downlink carrier phase originated from the uplink differential phase is regenerated from the despread quadrature baseband components and, hence, the coded user message is detected and decoded.